The present invention concerns a cutting device for plastic horseshoes according to the preamble of claim 1.

Shoeing equine hoofs is a longstanding farriery tradition. Hot-forged horseshoes of appropriate contours and sizes are burned onto the hoof and then nailed in place. The iron-made "soles" offer the advantage of relatively long durability. One of their drawbacks, however, is rather heavy weight and the rigid form which, moreover could not and cannot always provide an optimal fit to the hoof.

A few years ago, plastic horseshoes came into use to lessen the shock stress on a horse's joints and bones. Examples of such resilient flexible hoof protection means are described in DE 94 09 971 U1, DE 195 38 093 C2 and DE 196 30 660 C2. They are suited to compensate for uneven ground, particularly since they provide not only a vertical dampening under the load of the body weight, but also a limited horizontal extension of the contact area with the ground. Studs may facilitate walking and running in the open field.

Such horseshoes are typically made from transparent plastics, for example from polyurethane. It is difficult to obtain a durable glued joint with such material, and the changing loads will work it loose after a relatively short time. Nailing onto the hoof continues to be a proven method. This will be facilitated by marking in advance in the white marginal line, the so-called lamina, the best places for a minimum of nails which, however, may strain the wall horn merely to a minimum extent. Furthermore, smooth surfaces are important to prevent the horse from injuries even in case that some material parts brake off due to wear.

It is imperative to fit a horseshoe to the individual shape of each hoof. That has been done by rasping off projecting material parts, a time consuming method which may also require rework for smoothing. Yet there are devices for cutting plastic hoof protection devices, typically provided with a motor drive. However, the latter requires great expenditure and is often impractical when used outdoors. Generally, there is no power connection on pastures. Right there, however, it is often desired or necessary to fit a plastic protection device to a hoof.

It is an aim of the invention to overcome the shortcomings mentioned and to develop a cutting device which is simple in construction, economical to manufacture and easy to use. In particular, it should permit to fit a protection device to a hoof quickly at any place, most notably also in the open field, by hand operation.

The main features of the invention are indicated in claim 1. Specializations form the subject matter of claims 2 to 18.

A cutting device according to the present invention for plastic horseshoes has a base plate that bears a shaft which carries a cutting wheel adjacent to a workpiece support and which is activatable by a handle. The design is extremely simple. It consists of only few components, suitable to be manufactured and mounted at little expenditure. The use of the handy and portable device is location-independent and will not require any power connection.

The base advantageously supports a bearing block for the shaft whereby its a smooth and precise guidance is possible inside a sleeve. Alternatively, the base may comprise an angle bearing or forming the support of the shaft, for example an angle or knee by way of a punching part projecting upwardly from the base plate, in particular angled at 90° with respect to the top of the plate.

The cutting wheel is preferably mounted to the shaft in a replaceable manner. It may be a knife, a circular saw blade or the like which is ground on one side, in particular with an acute cone angle which facilitates the work on the workpiece. The cutting wheel advantageously comprises a toothing, notably with an asymmetric tooth profile, so that the workpiece is fed by the positive rotation of the cutting wheel. A protective plate, located in the area above the cutting wheel or suited to be shifted into this area and locked there, serves to protect from injuries when working with this device.

In a further embodiment of the present invention, the sense of rotation of the shaft is reversible as and when required, e. g. to facilitate and to adjust, respectively, the feeding of the workpiece or to allow an easy removal. In a particularly appropriate

version, the shaft is driven by a crank, a hand ratchet or the like, that is attachable to a shaped shaft end, which may comprise a lever adapted to be extended, if necessary, e.g. by telescopic extension, to increase the driving torque. The use of a reversible ratchet is particularly comfortable.

The workpiece support is preferably mounted to the base plate in an adjustable and/or replaceable manner so as to achieve optimum working conditions. Towards the cutting wheel, the workpiece support defines a cutting gap, i.e. the cutting clearance which is adjusted to the most convenient treatment. It may be useful to adapt the workpiece support to the shape of a hoof or to form it in an adaptable manner. Furthermore, safe handling is improved if a workpiece support comprises fixing means for the workpiece, such as a clamping device, or includes a surface that is roughened, ribbed and/or coated with an adhesive layer.

Further features, details and advantages of the present invention will be evident from the wording of the claims and the following description of the embodiments by way of the drawings, wherein:

Fig. 1 is a plan view of the cutting device according to the invention,

Fig. 2 is a top view, partially an axial section, of the device of Fig. 1,

Fig. 3 is a lateral view, partially an axial section, of the cutting device of Fig. 1 and Fig. 2, respectively, but without handle,

Fig. 4a is a plan view of a base plate with angle,

Fig. 4b is a top view of the base plate of Fig. 4a, and

Fig. 4c is a cross section taken on the line IVc-IVc in Fig. 4b,

Fig. 5a is a lateral view of a protective plate,

Fig. 5b is a plan view of the protective plate of Fig. 5a,

Fig. 6a is a front view, partially a sectional view, of a sleeve,

Fig. 6b is an axial section view of the sleeve of Fig. 6a,

Fig. 7a is a front view of the attachable end of a shaft,

Fig. 7b is a lateral view, partially a sectional view, of the shaft of Fig. 7a,

Fig. 7c is a front view of the shaft of Fig. 7a shown from the opposed end,

Fig. 8a is a longitudinal section through a cutting wheel, and

Fig. 8b, c, d is a plan view of a cutting wheel each.

Figs. 1 to 3 schematically show a cutting device, generally designated by 10, comprising a base plate 12 having an angle 14 extending upright from the latter. Said angle forms the support for a sleeve 32 in which a shaft 30 is guided that bears on its fitting end 36 a cutting wheel 18 which is mounted thereto by means of a locking screw 38. A protective plate 28 covers the upper area of the cutting wheel 18. A handle 20 acts upon a squared shaft end 34 of the shaft 30, with the handle preferably being a reversible ratchet having a ratchet head 21 and a lever 22.

On the rear, a flange 24 of the shaft 30 sits close to the angle 14 into which the sleeve 32 is screwed with a threaded end 33. The cutting wheel 18, firmly connected with the shaft 30, is arranged at the front end of the sleeve 32 in a slidable manner and comprises a conical grinding 19 on its rear. In front of the cutting wheel 18 is a workpiece support 16, in the illustrated example formed as a corner plate adjustable in depth in the oblong fixing hole 26. This allows to adjust the cutting gap and the cutting clearance, respectively, towards the cutting wheel 18. The protective plate 28 is fixed by screws that penetrate boreholes 29 in the plate 28 and are screwed into threaded holes 15 of the angle 14.

The cutting wheel 18 is detachably fixed to the shaft 30 for replacement. A fitting opening 37 (Fig. 8a to Fig. 8d) can be positively placed onto the fitting end 36 of the shaft 30, thus ensuring the firm seat of said cutting wheel. The elements 36, 37 preferably have a polygonal form, e. g. three-squared (trihedral) with rounded edges.

The shaft end 34 has on the opposite end of the shaft 30 an axial threaded blind hole 35, for example to attach a handle 20 to it. In particular, however, the shaft end 34 is formed as a square adapted to receive the ratchet head 21 of a commercially available ratchet serving as handle 20 without the need of fixation.

It will be apparent from Figs. 8a to 8d that the cutting wheel one side of which is provided with the conical grinding 19, preferably comprises a toothing especially with an asymmetric tooth profile like that of a circular saw blade. It is understood that

depending on the considered work, a cutting wheel with fine toothing (Fig. 8b) or with medium toothing (Fig. 8c) or with coarse toothing (Fig. 8d) can be used.

The invention is not restricted to any of the previously described embodiments but can be modified in diverse ways. To sum up it can, however, be stated that a preferred embodiment of a cutting device 10 for plastic horseshoes comprises a base plate 12 which supports a shaft 30 that bears a cutting wheel 18 adjacent to a workpiece support 16 and is activatable by a handle 20. The support of the shaft 30 bears or forms an angle 14, projecting upwardly from the base plate 12, in particular angled at 90° with respect to the top of the plate. The cutting wheel 18 is attached in a replaceable manner to the shaft 30 guided inside a sleeve 32 and may have the form of a knife, a circular saw blade or the like. It is ground one one side, in particular under an acute cone angle. If shaped as a circular saw blade, it comprises a toothing, specifically with an asymmetric tooth profile. There is a protective plate 28 above the cutting wheel 18. A reversible ratchet 20 may comprise an extended lever 22 and be attachable with its lever head 21 onto a shaft end 34, e. g. a shaft end having a square profile. The workpiece support 16 is mounted on the base plate 12 in an adjustable and/or replaceable manner. It defines a cutting gap extending towards the cutting wheel 18 and is preferably adapted or adaptable to the shape of a hoof. The support 16 may comprise fixing means for the workpiece, such as a clamping device, or include a surface that is roughened, ribbed and/or with an adhesive layer coated.

All the features and advantages disclosed in the claims, the description and the drawings, including design details and spatial arrangements, may be essential to the invention, both individually and in a great variety of combinations.

Reference signs

10	cutting device
12	base plate
14	angle
15	threaded holes
16	workpiece support
18	cutting wheel
19	conical grinding
20	handle / ratchet
21	ratchet head
22	lever
24	flange
26	oblong fixing hole
28	protective plate
29	boreholes
30	shaft
32	sleeve
33	threaded end
34	shaft end
35	threaded hole
36	fitting end
37	fitting opening
38	locking screw